

another instant that was gone. The final disappearance was so distinctly marked, that it could have been fixed easily to the tenth of a second.

"At about 4^h 52^m the illuminated border of the moon was observed in a state of most exquisitely clear definition. The fourth and third satellites of *Jupiter* were then advanced well away from the moon, but served admirably to indicate the precise point at which the planet was to be looked for. At 5^h 52^m 22^s a minute blotch of very peculiar and unlunar-looking light appeared as if *in front of* the moon's edge, seemingly projected upon the lunar surface. In another second a well-defined segment of the planet's disk was visible, clearly protruding beyond the sharply-cut lunar edge. From this time the difference of the planetary and lunar lights became very remarkable, the hue of the planet being an exceedingly *soft* greenish grey. When the disk of the planet was half exposed the belts presented themselves with far finer definition than they have ever been seen with before in the same telescope, *particularly towards the limb of the planet most remote from the moon.* For more than a minute they were traceable quite up to the edge of the planet's face with a lucidity strikingly unusual. They were also plainly *discernible up to the moon's edge*, but not so obviously as they had been when the dark limb of the moon was lying over the planet previously to the occultation. The surfaces of the moon and the planet were severed by a *half-transparent dusky line*, which had the appearance of being stippled off into the softer hue of the planet's disk. As nothing of this kind presented itself while the moon was passing in front of the planet, it is probable the effect was simply optical, and in some way due to the influence of the superior brilliancy of the lunar light. The effect was, however, very obvious and unmistakable."

*Occultation of Jupiter, observed at Haddenham, Bucks, on
2d January, 1857. By the Rev. W. R. Dawes.*

"The observations were made with the 8-inch object-glass, by Alvan Clark, mounted equatorially, and driven by clock-work.

"The state of the air was not very favourable at first; a thin hazy cloud producing diffusion of the moon's light, and rendering the obscure part of the moon quite invisible. A parallel wire micrometer was applied. I intended to observe with power 235; but shortly before the dark edge of the moon reached the fourth satellite, which was near its greatest elongation westward, the thin cloud rendered a lower power preferable, and I exchanged it for 160. Before I could get my eye settled again at the eye-piece, the fourth satellite disappeared.

"The *Third Satellite* disappeared at about 4^h 52^m G.M.T. The moon's dark edge, which was quite visible upon it, occupied about three seconds in passing over its disk.

"*Jupiter's* total disappearance occurred at about $5^{\text{h}} 0^{\text{m}} 15^{\text{s}}$ G.M.T. Definition pretty good at the time: the outline of the planet, and the belts, were sharply defined, as was also the dark edge of the moon upon the planet's disk. A large mountainous projection was seen on the part of the moon's limb, nearest the north belt. Not the slightest distortion was seen of the general form of the planet; nor were the belts in the least degree obscured by the proximity of the moon's edge. I, however, noticed a very slight *extension of the light along the dark edge*, to a distance of a second or two on each side of the planet's disk, which continued to be visible throughout the occultation. I have often noticed a similar appearance on the edges of a thick wire, when placed across the disk of a bright planet.

"*First Satellite*.—The edge of the moon occupied a *trifle more than two seconds* in passing over this satellite, and was distinctly visible upon its disk. Time not noted.

"*Second Satellite*.—The moon took *not quite two seconds* in occulting this satellite: between four and five beats of the chronometer were counted, which = about $1^{\text{s}}.8$. Edge distinctly seen upon it. Time of disappearance not noted.

"*Reappearance of Fourth Satellite*, at the moon's bright edge. Having previously placed a wire of the micrometer, so as to indicate the point of the limb where the satellite would reappear, my eye caught it the instant it projected from the edge, which was at that place very free from inequalities. I counted about four beats of the chronometer (= $1^{\text{s}}.6$) before it was quite free from the moon's edge. There was no projection on the edge, nor any unwillingness to separate. The colour of this satellite did not differ much from that of the moon, perhaps a trifle redder; but it was decidedly *fainter*. It came out as a perfectly round little disk, quite free from distortion. Time about $5^{\text{h}} 36^{\text{m}} 50^{\text{s}}$ G.M.T.

"*Reappearance of Third Satellite*, at about $5^{\text{h}} 48^{\text{m}} 8^{\text{s}}$ G.M.T. Time occupied in coming out about six or seven beats of the chronometer (= $2^{\text{s}}.6 \pm$), from first catching sight of it; my eye being well directed to the place by the micrometer wire. Colour of the satellite a *pale green*. It lost its light from contact with the moon's bright edge to a far greater extent than the fourth satellite did, in proportion to their usual brilliancy. Quite round, and free from any adhesion.

"*Jupiter* was of a *pale green* at its reappearance. Its *figure was perfect*; no distortion, nor diffusion of light where the edge of the moon cut the edges of the planet. A pale *bluish-purple* line, darkest close to the moon's edge, and gradually fading away, was visible on the disk of *Jupiter*. Its breadth was about $5''$, as nearly as I could judge. This was evidently the *bluish fringe of the secondary spectrum*,—the object-glass being a little overcorrected. Both the planet and the moon were sharply defined and pretty quiet. Total reappearance at about $5^{\text{h}} 59^{\text{m}} 15^{\text{s}}$ G.M.T.

"*Reappearance of the First Satellite*, at about $6^{\text{h}} 1^{\text{m}} 30^{\text{s}}$ G.M.T. Occupied about four or five beats of the chronometer in coming

out ($= 1^{\text{s}}.8 \pm$) from the first glimpse I observed of it. Not so pale as the third satellite, though obviously smaller, and seemed to suffer less in brightness from proximity to the moon. Quite round.

“*Reappearance of the Second Satellite*, occupied about four beats of the chronometer ($= 1^{\text{s}}.6$) after being first seen. The place was well indicated, as before, by the micrometer wire. The colour of this satellite was like that of the first, but its disk was obviously smaller. It was quite round, and parted from the moon without hesitation.

“The approximate geographical position of my observatory is in lat. $51^{\circ} 45' 50''$ north, and long. $3^{\text{m}} 44^{\text{s}}.0$ west.”

Note on the Occultation of Jupiter of January 2, 1857.

By W. R. Grove, Esq., V.P.R.S.

“Owing to the great kindness of Mr. Gillett, I was enabled to observe this occultation through his binocular telescope. This instrument is by Ross, the object-glasses $3\frac{3}{4}$ inches diameter, focal length 51 inches: portions (about $\frac{3}{4}$ inch) of the glasses are ground away to enable them to be approximated sufficiently for the distance between the eyes of the observer. The power used was 60, which gave a greater idea of magnitude than double that power in a monocular telescope.

“The dark limb of the moon was faintly visible throughout the time of the occultation. The disappearance of the satellites was not instantaneous as with a fixed star, but (as indeed might have been expected) they gradually faded away. The light of the moon's edge was too feeble for me to ascertain whether they disappeared at the exact edge or not. I should say that they seemed to be a little within it, but I could not positively assert this. *Jupiter* was cut off with perfect sharpness, and I could not detect the slightest distortion. When about one-third was eclipsed the light of the planet appeared brighter along the edge of the moon; and this apparently increased brightness continued until it was about three-fourths eclipsed. Two spots in the neighbourhood of the upper belt (as viewed by inverting telescope) were notably bright, so as to attract attention, and they continued so during the period above mentioned, each looking somewhat like an electric glow coming off the dark edge of the moon. This effect may be optical, and caused by the immediate proximity of darkness to central and more luminous portions of the planet, but it was very marked. I observed no other effect during the period of immersion. I looked for an effect said to have been observed on previous occasions, viz. a faint illumination of the dark edge of the moon upon contact, but could not detect the slightest trace of it. On emersion I could detect no distortion of any sort, nor did I see the dark line which I noticed in the occultation of Nov. 8, 1856. The difference of light and colour between the planet and the moon was the same as then observed.